

1 semiconductor die. Fig. 4D of Wen, to which the Examiner has specifically
2 referred, shows parallel word lines 43a and 43b. Note, however, that neither Fig.
3 4D nor any other of Wen's figures show any actual contacts for connection to
4 external components. In fact, the reference specifically notes at col. 7, lines 21-25,
5 that certain steps, including formation of contacts, are not specifically described in
6 the patent document. Thus, the Wen reference contains no teachings related to the
7 location of contacts on a semiconductor die. The Examiner has conceded in the
8 Office Action that Wen does not disclose "electrical contacts at opposite edges of
9 the substrate configured to allow communications through the channels via the
10 electrical contacts, and connecting portions at both ends of the module." Office
11 Action, page 2, lines 21-24.

12 Mettler describes electrical contacts connected at an end of a substrate by a
13 connector. Fig. 7 of Mettler, to which the Examiner refers, shows a single
14 connector 52 at one edge of the substrate. Electrical leads (contacts) 22 that make
15 up a set of leads (contacts) 48 extend from IC 26 to the single connector 52. A
16 second set of leads (contacts) 54 from the IC 26 is wrapped around the substrate
17 and is connected the single connector 52 (see col. 6, lines 9-12 of Mettler). The
18 intent behind Mettler is to provide a single common connector located on a single
19 edge that accesses the leads (channels) to the IC. Therefore, providing *electrical*
20 *contacts at opposite edges* is not suggested by Mettler, and in fact goes against the
21 teachings found in Mettler.

22 Tamarkin describes memory devices with contacts at opposite ends, but
23 does not show a channel that passes through the memory devices. Fig. 2 of
24 Tamarkin, to which the Examiner refers, shows a set of various random access
25 memory (RAM) modules 24 connected to connectors 18, 20. Note, however, that

1 neither Fig. 2 nor any other of Tamarkin's figures show any channels that connect
2 the modules on the substrate and allow communications between the modules.

3

4 **§ 103 Rejections**

5 Claims 1-8, 11-21, and 23-28 have been rejected as being anticipated by
6 Wen in view of Mettler and Tamarkin.

7 **Claim 1** recites in part:

8 a plurality of memory devices disposed on the substrate;
9 a plurality of channels extending between the opposite edges,
10 wherein each of the plurality of memory devices is coupled to
one of the plurality of channels; and
11 electrical contacts at the opposite edges of the substrate configured
12 to allow communications through the channels via the
electrical contacts.

13

14 As discussed above, Wen does not disclose "electrical contacts at opposite
15 edges of the substrate configured to allow communications through the channels
16 via the electrical contacts, and connecting portions at both ends of the module."

17 As stated in the Office Action, Mettler teaches the use of a connector at
18 "an" end of a substrate—at a single end of the substrate. Mettler, in fact, takes
19 great pains to make sure that the connections are all at one end of the substrate,
20 showing various techniques for wrapping conductors around the substrate for use
21 with a single connector. Thus, Mettler *teaches away* from the recited elements of
22 claim 1, which include "electrical contacts at the opposite edges of the substrate."
23 The law is clear that any reference that teaches away from a claimed feature in this
24 manner cannot be used in a combination purported to show the obviousness of the
25 claimed feature:

1 Numerous decisions recognize that an invention that otherwise
2 might be viewed as an obvious modification of the prior art will not
3 be deemed obvious in a patent law sense when one or more prior art
4 references “teach away” from the invention. E.g Gillette Co. v. S.C.
Johnson & Sons, Inc., 919 F.2d 720, 724, 16 USPQ2d 1923, 1927
(Fed. Cir. 1990) (the closest prior art reference “would likely
discourage the art worker from attempting the substitution suggested
by [the inventor/patentee].)

5 Chisum on Patents, Vol 2, chapter 5, §5.03, G. Thus, because Mettler explicitly
6 teaches the need for all contacts to be at a single edge of a substrate, this reference
7 highlights the *non-obviousness* of claim 1, which recites “electrical contacts at the
8 opposite edges of the substrate.” Mettler cannot fairly be said to establish the
9 obviousness of electrical contacts at opposite edges of a substrate.

10 In addition to reciting contacts at opposite edges of a substrate, claim 1
11 recites a plurality of channels extending between the edges, wherein the electrical
12 contacts at the opposite edges “allow communications through the channels via the
13 electrical contacts.” The Office Action does not establish any suggestions for such
14 an element. As discussed above and conceded by the Examiner, Wen does not
15 show electrical contacts, and Mettler shows an electrical connector only at one
16 edge.

17 The Office Action recognizes these shortcomings of Wen and Mettler,
18 citing Tamarkin for its disclosure of connectors at opposite ends of a substrate.
19 However, there is nothing in Tamarkin to suggest the use of such connectors in
20 conjunction with a structure having “channels extending between the opposite
21 edges,” wherein electrical contacts at opposite edges “allow communications
22 through the channels via the electrical contacts,” as recited by claim 1. There is no
23 obvious combination of the three cited references which would satisfy these claim
24 elements.

1 Specifically, there is nothing in any of the references that would have
2 suggested utilizing connectors at each end of Wen's channels. The Examiner
3 asserts that this would have been suggested by Tamarkin. However, Tamarkin's
4 connectors are not used at either end of a channel. Furthermore, the cited art fails
5 to recognize any advantages or even any utility in using connectors at opposite
6 ends of channels. In this regard, Wen does not even discuss connectors, while
7 Tamarkin fails to utilize connectors that allow communications *through* such
8 channels. The advantages of the claimed structure are apparent only in light of the
9 Applicant's disclosure. Absent any recognition in the prior art of such advantages,
10 it cannot be said that it would have been obvious to modify the references to result
11 in the claimed structure.

12 The law is clear that any combination of references must be supported by a
13 suggestion, in the references themselves, of the desirability of the combination:

14 To establish a prima facie case of obviousness, three basic
15 criteria must be met. First, there must be some suggestion or
16 motivation, either in the references themselves or in the knowledge
17 generally available to one of ordinary skill in the art, to modify the
18 reference or to combine reference teachings. Second, there must be
19 a reasonable expectation of success. Finally, the prior art reference
20 (or references when combined) must teach or suggest all the claim
21 limitations. *The teaching or suggestion to make the claimed
22 combination and the reasonable expectation of success must both be
23 found in the prior art, and not based on applicant's disclosure."*

24 MPEP, section 2142, 2100-108 (Rev. 3) (emphasis supplied).

25 In this case, the prior art discloses no advantages or utility for the proposed
26 combination. Accordingly, the combination proposed by the Examiner would not
27 have been obvious, and the rejection of claim 1 is unfounded. Allowance of claim
28 1 is respectfully requested.

1 **Claims 2, 3, 4, 5 and 6** depend on claim 1 and are allowable both for their
2 additional recited elements and because of their dependence from an allowable
3 base claim.

4 **Claim 7** recites:

5 a first substrate having a plurality of memory devices disposed
6 thereon and a first channel portion extending across the first
7 substrate, the first substrate having opposite ends and contacts
at the opposite ends to allow communications through the
first channel portion via the contacts at the opposite ends of
the first substrate.

9 As discussed above and conceded by the Examiner, Wen does not show
10 electrical contacts, and Mettler shows an electrical connector only at one edge,
11 while Tamarkin fails to suggest connectors that allow communications through
12 channels.

13 Claim 7 further in part recites:

14 a second substrate having a plurality of memory devices disposed
15 thereon and a second channel portion extending across the second
16 substrate, the second substrate having opposite ends
and contacts at the opposite ends to allow communications
through the second channel portion via the contacts at the
opposite ends of the second substrate; and

18 a first connector configured to communicatively couple the first
19 channel portion to the second channel portion through at least
some of the contacts of the first and second substrates,
wherein the first connector engages contacts at a first of the
20 ends of the first substrate and engages contacts at a first of the
ends of the second substrate.

21 First and second substrates with first and second channels are described in
22 the flowchart of Fig. 6 and on page 13, lines 5-10 of the specification. This is
23 further illustrated in Fig. 7 as substrates 502, 506, and 510, and described on page
24 14, lines 2-3 of the specification. The cited references do not suggest a second

1 substrate, a second channel and a connector to couple the first and second
2 channels. Tamarkin shows stacked circuit assemblies (substrates) and a connector
3 connecting the assemblies; however, Tamarkin fails to suggest the use of
4 communication channels, or, specifically, the use of a connector to couple first and
5 second channel portions as recited by claim 7. Wen and Mettler similarly fail to
6 suggest such a connection. Furthermore, the Office Action fails to acknowledge
7 this recited element of claim 7, and does not point to anything in the references
8 that would have suggested a first connector as recited in claim 7. Accordingly, the
9 rejection of claim 7 is unsupported by the prior art, and should be withdrawn.

10 **Claims 8, 11, 12, 13, 14, 15, 16, 17, 18, and 19** depend on claim 7 and are
11 allowable both for their additional recited elements and because of their
12 dependence from an allowable base claim.

13 **Claim 21** recites:

14 a first memory module having contacts at opposite ends thereof, a
15 first channel portion extending across the first memory
module between the contacts;

16 a second memory module having contacts at opposite ends thereof, a
17 second channel portion extending across the second memory
module between the contacts;

18 a first connector coupling the first memory module to the second
19 memory module through contacts at first ends of the first and
second memory modules; and

20 a second connector that engages contacts at the second ends of the
first and second memory modules.

21 As discussed above, there is no obvious combination of the references that
22 would have suggested the recited structure and interaction between components.

23 Allowance of claim 21 is respectfully requested

1 **Claim 23** depends on claim 21 and is allowable both for its additional
2 recited elements and because of its dependence from an allowable base claim.

3 **Claim 24** is allowable for reasons similar to those presented above.
4 Accordingly, it is respectfully requested that claim 24 be allowed. Claim 24
5 recites:

6 arranging channel portions on a substrate such that the channel
7 portions extend between opposite edges of the substrate;

8 arranging contacts at the opposite edges of the substrate to allow
9 communication through the channel portions;

10 arranging channel portion conductors such that the length of the
11 channel portion conductors between opposite edges of the
12 substrate is approximately equal; and

13 coupling together a pair of such substrates using a connector, a
14 channel extending across the pair of substrates and the
15 connector

16 Although Tamarkin shows stacked circuit assemblies (substrates) and a
17 common connector connecting the assemblies; Tamarkin fails to suggest the use of
18 communication channels. Furthermore, the Office Action does not indicate any
19 suggestion in the prior art of “coupling” a pair of substrates in this manner. Thus,
20 allowance of claim 24 is respectfully requested

21 **Claims 25, 26, 27, 28, 29, and 30** depend on claim 24 and are allowable
22 both for their additional recited elements and because of their dependence from an
23 allowable base claim.

24 **Claim 31** is allowable for reasons similar to those presented above.
25 Accordingly, it is respectfully requested that claim 1 be allowed. Claim 31 recites:

26 one or more board connectors that engage the contacts at the first
27 ends of the first and second memory modules to allow
28 communications through the one or more communication
29 channel portions of the memory modules.

1 As discussed above, none of the cited references suggest such a feature.
2 Allowance of claim 31 is respectfully requested.

3 **Claims 32 and 33** depend on claim 31 and are allowable both for their
4 additional recited elements and because of their dependence from an allowable
5 base claim.

6 **Claim 34** is allowable based on the arguments presented above.
7 Accordingly, it is respectfully requested that claim 31 be allowed. Claim 34
8 recites:

9 a substrate having opposite ends and at least one surface;
10 contacts at the opposite ends of the substrate;
11 one or more memory devices mounted to the surface of the substrate;
12 and
13 one or more communication channel portions extending across the
14 module between the contacts, the one or more communication
 channel portions being configured to allow communications
 through the contacts with the one or more memory devices.

15 As discussed above, the references do not suggest communication channel
16 portions extending between contacts such as recited in claim 34. Allowance of
17 claim 34 is therefore respectfully requested.

18 **Claims 35, 36, 37, and 38** depend on claim 34 and are allowable both for
19 their additional recited elements and because of their dependence from an
20 allowable base claim.

1

2 **Conclusion**

3 It is respectfully submitted that all claims are in a condition for allowance,
4 and action to that end is requested. The Examiner is requested to telephone the
5 undersigned if that would be helpful in expediting allowance.

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9 By:

10 Respectfully Submitted,

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